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COMMUNICATION, THE ACT, AND THE OBJECT WITH REFERENCE TO MEAD

WHETHER John Dewey's estimate of George H. Mead as a seminal mind of the first order is acceptable or not, few will deny the importance of his thought or its continuing influence. It is because I have found his writings stimulating and provocative, and at the same time confusing if not confused, that I have been led to attempt a critical analysis of some of the central ideas of his philosophy.

The most fundamental concept is that of the "act." The analysis of this is the central theme of Mead's philosophy, and it is as specialized developments and variations of this central theme that his theories of the physical object of science with the separation of space and time from spatio-temporal order, of emergence, of self and mind, language and reflective thought, are all treated. Whether his treatment of these topics as they appear in his three published works, *The Philosophy of the Present, Mind, Self and Society,* and *The Philosophy of the Act,* actually constitutes a systematic body of internally consistent doctrine, I am not concerned to consider. My purpose is rather to inquire whether his formulated doctrines do justice to his own insights and make adequate use of his own fundamental concepts.

Acts, as conceived by Mead, occur in nature wherever there are living organisms.[1] An act is not a mere temporal series of passing events, but it is a process directed toward an end, in which the consummation is functionally present in the beginning, controlling the process. Even the twining of a plant is not a mere senseless series of movements in different directions, but is a continuous activity of turning toward the light. It is this constant fixity of end that gives unity to the series and constitutes it an act. At a higher level the act occurs in a more complex but fundamentally similar fashion. The animal which sights or smells its prey at a distance stalks it in anticipation of eating it. The stalking is not merely locomotion toward the distant object, but is itself preparation for the final spring, as the spring, when it occurs, is preparatory for

[1] It may be of interest to compare the author's own discussion of "the complete act" in *Speech: Its Function and Development,* chap. viii.

the seizure by the jaws and the consummation of chewing and swallowing. As his mouth may water and his digestive juices begin to flow from the first smell of the distant prey, so the end is present to the active organism from the beginning.

Human acts, from perception to reflective thinking, emerge from such behavior as this, and exhibit the same fundamental structure along with new and distinctive features. Human acts are essentially social. The human being, even in the securing of food, does not act merely as an individual, but as a member of a group engaged in concerted action for a common end. His individual acts, at least so far as they exhibit mind and intelligence, are "abstracted fragments" (Charles Morris, ed., *Philosophy of the Act*, p. ix) from such a complex social act. The human individual, indeed, has a mind in so far as he has internalized symbolically the social act.

"Sociality" is thus in Mead's philosophy a concept almost, if not quite, equal in importance to that of the "act" itself. Like the act, sociality occurs at different levels. Its most general definition is given by Mead in *Philosophy of the Present* as "the capacity for being many things at once." Thus at the highest level organized society depends on the capacity of men to be at once fathers and husbands, citizens, philosophers and rulers, officials of a political party and patriotic citizens, and, above all, complete individuals and members of society. If these claims conflict, such conflict marks the limits of the sociality achieved. At the human level sociality appears also in the objects of men's acts. The gold in the eternal hills becomes a wedding ring, a king's treasure, or a prisoner's bribe. So a book may be at once achievement of an author's ambition, a publisher's remainder, and an evening's delight to a reader. At a lower level, sociality is found in the flower of the plant which is at once a means of propagation for the plant and a source of food to the fertilizing bee. Taken in its widest generality, indeed, sociality appears even within the act, in that like a melody it must have the end present in the beginning and the whole in the part. Even so the specious present is social in that it includes within itself as integral to it past and future.

If this concept of "sociality" is illuminating, affording opportunity for wide and fruitful application, it is not without danger. For in being generalized it may become so abstract that its application in particular cases, especially the more complex cases, may lose its significance. For example, it might well be urged that inanimate objects are also social. A cloud casts a shadow and contains particles of moisture; water dissolves sugar and precipitates lime; the same body is part of the crust of the earth and of the bed of

the Pacific Ocean. If to be social is to have the capacity for being many things at once, then everything existent is social.

That Mead does not always escape this danger is perhaps more evident in his treatment of the concept of "coöperation." Yet no one has done more than he to distinguish coöperation as it occurs at the human level from the simpler form of coöperative action among the lower animals.

I do not find any general definition of coöperation given by Mead such as he gives of sociality, but we may gather its meaning from his usage of the term. A favorite illustration of coöperative action is a dog fight. It not only takes two to make a fight, but for the fight to continue it is necessary that the acts or gestures of each dog should stimulate the other to a response, which in turn serves as a reciprocal stimulus to the first. It is the rôle played by the behavior of one individual in stimulating the response of another that Mead treats as the significant feature of coöperative action. If it seems ridiculous to us to call a dog fight coöperation, that is because the dogs have no common end. The result of their reciprocal behavior, the continuation of the fighting, is not indeed what either dog wants; on the contrary each is trying to end the fight, although in opposed ways. Mead's failure to consider a community of end to be essential to coöperation, as evinced by his use of this illustration, is even more evident in his extending the concept to include responses to physical objects. One could not walk, Mead points out, unless the ground resisted the pressure of our feet; so also our handling of objects involves a reaction of resistance on their part which is the counterpart to the pressure exerted by our hands. It is owing to this mutual resistance that we are led to attribute a dynamic "inside" to objects and become aware of our own bodies. In manipulation, as in the dog fight, the pressure of the hand against the object calls out the resistance on the part of the object, and this in turn excites the organism to further manipulatory exploration and response. Perception of the object (which I wish to consider in more detail later) occurs in so far as the organism responds to the distance stimulus (vision) by anticipatory preparation of manipulatory response, thus, as Mead says, playing the rôle of the object in stimulating itself as the object would if it were "at hand." All manipulatory action, like walking, or indeed any bodily movement, thus is essentially coöperative in that it can be maintained only through reciprocal action and reaction between the organism and physical objects. But this extension of the concept is possible only if the "end" of the action is identified with physical effect. The walking organism may indeed be directed toward an end and so perform a genuine "act," as Mead has defined

it, but to impute this to the inanimate object in its mechanical resistance, is to rob the concepts of both "coöperation" and of "act" of all theoretical significance.

Mead's emphasis on the reciprocal stimulation of one another by coöperating individuals and his neglect of the end as an essential factor in coöperation has further consequences of great theoretic importance, both in his analysis of communication through significant symbols, and in his analysis of the physical object of common sense. In order to show this let us make certain distinctions.

A number of individuals may be said to be engaged in "composite" action when each contributes independently to a joint result. An example of "composite" action would be the accumulation of a pile of stones by a number of individuals each of whom deposits a stone whenever he passes a certain sacred spot. Here the end is merely individual or private.

A group of individuals engage in what we may call "concerted" action when, on the other hand, the movements of each are controlled and adjusted to the movements of others. The movements of a grazing herd would be an example, and so also would be the hunting of a pack of wolves, or the behavior of ants or bees.

The end of concerted action may be "shared," but it is not a "common" end. The end of the concerted hunt, for example, is shared in that the kill is made and the food secured through joint acts. The food is there for all but for each severally, since each eats only his own individual food. Each wolf may be said to hunt only *for* himself, although he hunts *with* others in concerted action.

Genuinely coöperative action is to be distinguished from this in that it is directed toward a *common* end. An end is common when its being an end for one individual is integral to its constituting an end for the other. Most distinctively human ends, the "goods" of life, are of this sort. The housewife will not usually cook a dinner for herself alone, nor can any of us enjoy a feast in solitude, much less if the food disgusts or nauseates a companion. Let us, following Mead's example, indulge in a little social psychology to discover what is involved in this fact.

A human being is so constituted that the expression of emotion in another individual calls out an answering emotion in himself. Sometimes this is reciprocal, as when your angry looks directed at me rouse my anger toward you, or my fear of you. If your emotion or your obvious feeling is not directed toward me, but toward a third person or object, I may also be roused to emotion directed either toward you, as when a child's fear of a dog arouses the tender reassurance of his older companion, or toward the third person or object, as when the child's fear arouses the mother's anger

toward the threatening dog. A man naturally loves at least some other human beings not merely in the sense of entertaining tender emotions toward them, but in the sense of cherishing them and making their welfare and happiness his own end. But this involves more than a mere emotional response toward others; it involves the apprehension of others as acting for ends, as directed upon objects, and of objects as matters of concern for others. It also involves the distinguishing of living conscious beings from inanimate objects, first, as acting in pursuit of ends, and, second, as hostile or friendly both to ourselves and to others. Furthermore it is through the apprehension of others as friendly or hostile, and thus as acting toward ourselves as ends, that we become aware of ourselves as selves and of others as other selves. It is only individuals who are selves who can have genuinely common ends and who can coöperate for these ends. Such ends are sought by each individual because they are apprehended as ends for others. Such ends must first be apprehended in their relationship to others as well as simply "there" and secondly this relationship of being ends for others is intrinsic to their being an end for the self.

Now I do not intend to assert that this psychological analysis is foreign to Mead or even that every point just made is not to be found in his writings. It is rather that he does not make adequate use of the distinctions involved in such analysis in his treatment.

What I wish to emphasize is this: as common ends can be sought as common only in being apprehended as ends for others, so others can be apprehended as selves with whom one may coöperate only so far as they are recognized as acting towards ends in relation to oneself. Being selves is never a merely reciprocal affair between two individuals, in which they are mutually ends and means for each other. There must always be involved the relation of each to a third factor, an end objective to each, which is integral to their reciprocal relationship to each other. It is this which Mead neglects in his treatment of human coöperation and communication through significant symbols.

Animals coöperate, he tells us, in so far as the behavior of one acts as a stimulus to the other to carry on its part in a composite enterprise. Human coöperation differs from this in that the vocal gesture uttered by one individual not only acts as a stimulus to the other to an appropriate response but *stimulates the speaker to the same response.* Along with his own response he arouses in his hearer sociality. The essential feature of the development of communication, writes Mead,

> is the stimulation in one organism that is exciting another to the same response that it arouses in the other. The vocal gesture is pre-eminently adapted to this function because it affects the auditory apparatus of the form that produces it as it does the others. The final outcome in human social conduct is that the individual, in exciting through the vocal gesture the response of another, initiates the same response in himself and, in the attitude of the other, comes to address himself, that is, he appears as an object to himself in his own conduct [*The Philosophy of the Act*, pp. 189–190].

Now Mead is led to make this formulation because of the very depth of his insight into the nature of communication. He points out as no other writer has done the conditions which must obtain if communication is to take place. If I criticize his treatment for its inadequacy in certain fundamental respects, it is because I recognize the importance and value of his contribution. The importance of his analysis of language lies in this: The utterance of sounds does not become language from the fact that it stimulates the individual who hears them to respond in such a way that an end for both is secured. The dog who obeys the command: "Fetch the ball!" has enjoyed no communication of meaning; he has heard a signal, if you please, but he has not heard what Mead calls a significant symbol, even though the man has himself uttered sounds which for him are such symbols. They would become significant for the dog only if he were able to play the part of the man and himself use the words to elicit a similar response from another. To use sounds or other gestures as significant symbols one must be able to play both the rôle of the speaker and that of the hearer. One must, in Mead's terms, "play the role of the particular other and the role of the generalized other." We may find an illustration of Mead's meaning in the playing of any organized game. Such a game must have rules and the individual in playing it must act as any other player in his position would act. Thus a football "tackle" must play the rôle of a particular other ("tackle" and not "center") and he must also play the rôle of a generalized other in that he must play tackle as any "tackle" would play. Moreover, he is playing against individuals who are themselves playing particular rôles in a generalized way. Using a language is playing such an organized game. To speak intelligibly one must use standardized sounds in a standardized way, one must speak, for example, in the first person using the form of the verb to agree with the first person singular. Convention may establish, to be sure, that on occasion, perhaps in some forms of literary composition, one avoids this usage and uses the editorial "we," or even speaks in the third person, as "the present writer." But whether I use "I" or "we" or the imper-

sonal form, I must speak or write as any user of the English language would do under similar conditions. It is this unique individual, indeed, who speaks, but I, who speak to be understood, must speak as any "I," and you, my intelligent listeners, must hear as any "you's." If you and I could not do this, we could not cooperate as citizens of a state in its essential democracy, nor could we be moral beings, subject to a self-imposed categorical imperative; we would not, in short, be rational beings at all. Mead thus exhibits the use of significant symbols as constituting the very essence of rationality, the ability to play the rôle of the generalized other. It is the use of such symbols which is the fundamental manifestation of rational intelligence, upon which all other forms of rational activity are dependent.

If rational thought, like virtue, is essentially ideal and a function or character of the soul within, rather than of the individual as a natural creature in his public dealings with his fellows in an external world, as Mead himself would urge, that is because the rational and moral individual is one who has attained selfhood in becoming another to himself. Man may be born with a soul, as no animal is, if you please, an intrinsically rational being; but his soul remains dormant, his rationality merely potential unless he is aroused by his fellows to coöperative action and the achievement of language. It is only when the give and take of reciprocal stimulation and response to others has become internalized in the form of inner conversation, when one has learned to address oneself as another and to respond to such address as to another that one has become a self or achieved rationality. One thinks reflectively in order to find answers to the questions one asks oneself. But one asks and answers such questions as any self or any other, in short, as a rational being. Such is the ideal function of language as Mead's profound insight has disclosed it. But this ideal inner function is correlative with its natural public function in controlling coöperative action toward distant ends. The analysis of the one function must yield a corresponding analysis of the other function.

Let us return to Mead's formulation. The use of significant symbols involves genuine communication, says Mead, in so far as the speaker not only stimulates the hearer to a response toward a distant end, but in so doing stimulates himself to the same response he elicits from the other. The meaning of what is said, Mead states, is to the hearer the response he makes, and the identity of meaning for speaker and hearer, essential to communication, lies in an identity of response on the part of each.

> We must be constantly responding to the gesture we make if we are to carry on successful vocal conversation. The meaning of what we are saying is the tendency to respond to it. You ask somebody to bring a visitor a chair. You arouse the tendency to get the chair in the other, but if he is slow to act you get the chair yourself. The response to the vocal gesture is the doing of a certain thing, and you arouse that same tendency in yourself. You are always replying to yourself, just as other people reply. You assume that in some degree there must be identity in the reply. It is action on a common basis. [*Mind, Self and Society*, p. 67.]

The reader of this passage (and there are many such passages in Mead's writings) is torn between appreciation of the point Mead wishes to make, and repudiation of what he has actually said. The difficulties are so many and so obvious that it is hard to decide where to begin criticism. If one takes it at its face value it seems to involve the absurdity that it is only in being stimulated by the sound of our own voices that we come to understand what we say, in which case the problem of how we are able to formulate significant remarks would be insoluble. But leaving this obvious absurdity, we are still faced with the difficulty of equating the meaning of what is said with the response made to it. Even in a case where it might most plausibly be urged, for example of a command which "to hear is to obey," the obedience is a response to the command as uttered by the proper person under proper circumstances and not to the symbolic expression itself. This may retain a constant meaning while eliciting the most diverse responses on different occasions. The naughty child evinces his understanding of his mother's command, "Come in and do your homework!" as much by running away, or by pleading a headache, as by obedience. Nor is the mother's understanding of her own command to be found in any incipient tendency on her part to play the particular rôle to which she tries to incite her child. An incidental, if important, weakness of Mead's formulation is its failure to make any distinction between the three fundamental forms of speech, the command, the declaration, and the question, in their relation to responsive behavior. The command is, of course, intended by the speaker to elicit a particular response, even though its meaning can not be equated with this response. A declaration has a far less direct relation to response, and the response may be symbolic reply or an act of primary behavior. A question demands a symbolic reply, and if by its meaning and form it prescribes a range of possible answers its meaning is not to be equated with any particular response. A question may, indeed, like any form of speech, express a *double entendre;* it may be used to convey a threat, or an insult, or a compliment, and one may reply to the intention thus conveyed. But,

and this is essential to the significance of symbolic utterance, it could not convey the intended threat or insult unless it had a symbolic significance independent of this particular use.

Yet Mead is right so far as he is contending for an organic relation between meaning and response. One who speaks to us in a foreign tongue which we do not understand leaves us blank and baffled. On the other hand we test the understanding of our students by the replies they make to our expositions or to the statements of the text. We may even devise a cunning examination such that an affirmative answer to a question is conclusive evidence of the student's understanding a given proposition and a negative answer equally conclusive evidence of his failure to understand. And in asking such a question the examiner has certainly prepared the answer, his own answer, in advance. Test of communication, of identity of meaning as between teacher and student, would surely seem to lie here in identity of response on the part of the two communicants. But this would be a hasty and ill-judged conclusion. For the reply of the student is to the *question* primarily rather than to the statement the question is designed to test. And it may happen, as we professional examiners know only too well, that the student may have misunderstood the question when quite clear about the statement at issue. To discover this, we must ask a second critical question about the first, and assume that this is understood if we would test the understanding of the first question.

If I have labored an obvious point, it is in order to emphasize the all-important fact that speech as a symbolic act is only a *conditional* determinant of response. This is equally true whether the response be an act of primary behavior, or a reply in symbolic terms. The statement "Your house is on fire!" may be made with the intention of rousing you to suitable action, but it does not prescribe what this action is to be in the particular case. The significance of the statement is not to be identified with your actual response, nor is it exhausted in any list of possible alternative responses you might make. It has a universality which is not reducible to any number of alternative particulars. Similarly, if a remark is made in conversation with the intention of eliciting a reply, its symbolic significance is not to be identified with the rejoinder, however relevant such rejoinder may be. Actually, of course, one replies to what one takes to be the intention of the other in making the remark; one interprets the remark as made by the particular conditions. In this sense conversation involves a playing the rôle of the particular other. The first speaker "adapts" his remarks to his particular hearer, and the hearer "interprets" the remarks

addressed to him by the particular speaker. In some sense language is always *used*, is *directed* to some audience or special public for some purpose. Whether like the radio speaker skillfully conducting political propaganda, or the scholar reading a Platonic dialogue, one must adapt and interpret and thus play the rôle of the particular other. Apart from such directed use it may well be urged that language has no meaning, symbols no significance. But the propagandist could not make the particular use of language that he does make if the words and phrases he utters did not have a universality of significance which makes them usable for other purposes and on other occasions. Nor could the scholar begin to interpret Plato without an understanding of the terms of his discourse; he must interpret what Plato means in terms of what Plato says. Both speaker and hearer must, in short, play the rôle of the universal other in order to play the rôle of the particular other, and neither can play this rôle unless the other is playing it also. There is indeed an identity of action between communicants, but it is not an identity expressible in terms of particular acts. Playing the rôle of the universal other must necessarily be carried on, actualized in a particular rôle. It is like an essence which can exist only as the form of a concrete individual along with accidents. The particular accidents may vary but the essence remains the same.

The fundamental fallacy of Mead's treatment of communication is thus akin to that of the English empiricists. It lies in his reduction of the shared universality of symbolic significance to a mere identity of particulars.

If we now turn to his treatment of the act and the object we may find a complementary inadequacy in his analysis of the object. We have already seen that he analyzes coöperation in terms of the reciprocal control of one another's acts, neglecting to analyze the nature of the common end to which such acts are directed. The community of end recognized by Mead seems to consist in its being the end of identical responses on the part of the coöperating individuals. Its status as the end thus lies in its place in the act of each as a particular response. Now coöperation, it must be acknowledged, can take place only in a world not only of common ends but of common objects. A common end is an objective end and any object, as such, must be intrinsically capable of being common either as potential end or potential means. An object must be intelligible, knowable by intelligent rational beings. Even if we distinguish the object of perception from the object of judgment, we must recognize that the objects perceived are such as can be judged. So the objects constituting the field of action of a rationally perceiving indi-

vidual must be such as may be constituents of the field of another's action.

The object of human perception, as Mead analyzes it, is the spatio-temporal or physical object. ("Physical" object here does not mean the object of physical science but that of ordinary human experience.) It is the colored, fragrant, substantial, resistant thing, large or small, hard or soft, round or square or pointed, now existing at a distance and enduring in its self-sameness as I move toward it or away from it, and while handling it at arm's length. That it is such as this, Mead explains, is due to the fact that it is the manipulatory object of an organism with visual distance receptors, the object of man uniquely endowed with mutually adjusted eyes and human hands. It is not the consummatory end of a human act, as is food, for example, for manipulation is not a consummation, but a halfway stage in the completed act. A human being perceives an object because he sees something not only to be reached presently by taking so many steps toward it, but something he can handle and look at simultaneously, seeing what he touches and touching what he sees. From his first glimpse of the distant vision he is preparing his manipulatory response, incited by the vision to stimulate himself as the thing would if within his grasp, thus playing, in Mead's phrase, the rôle of the other and so generating both object and his own bodily self. He thus organizes in advance, by a sort of preliminary ideal trial and error of tentative alternative manipulatory movements, the completed act which leads through prepared manipulation to final consummation. It is bebecause the human act is thus broken by the intervening manipulation while still remaining a single continuous act directed to a constant end, that primitive passage is bifurcated into exactly and permanently simultaneous spatial positions on the one hand and a succession of discrete temporal instants on the other.

I am not concerned to discuss here the subtleties of Mead's treatment of space and time. Leaving this aspect of his philosophy aside, let us consider quite naturalistically and naïvely Mead's analysis of the object in terms of manipulation. As he pictures it, handling an object is (appears as) a preparation for consummation, a halfway house between seeing and eating, for example, in which man may peel his fruit or dismember his prey before putting it into his less efficient human mouth. That human manipulation is more and other than this, Mead is, of course, as well aware as you and I. But he does not take account of this in his analysis. The object of human perception, as he analyzes it, is the object one handles directly; its hardness and resistance lie in its reaction to direct pressure, its shape and size are perceived in terms of the stretching and

flexing of fingers and hand moving in contact with its contours. But the simple and all important fact is that man's hand is a tool-using hand. He perceives objects in perceiving them as possible tools, or as things to be reached and poked and pounded and shaped by means of tools. He perceives a tool, to be sure, as a thing he must grasp with a certain strength of fingers and hand, but also as long enough to reach one object and not another, of a shape and size to fit one aperture and not another, as heavy enough to smash a given object when thrown, sharp enough to cut with, etc., etc. Manipulation is no mere transition between distant vision and final consummation, not a stage in a single act, but a focal center from which radiate out an interlacing network of possible acts.

If manipulation is considered as it is in itself, as a handling and moving of fingers, hand, and arm in relation to the body, it falls into a limited range of possible movements and combinations of movements. There are alternative ways of grasping and handling any object by itself. The organism has a repertoire of possible alternative direct responses, and, as Mead analyzes it, it is in the anticipatory selection and organization of these that the perceived object emerges. The object is thus essentially a factor, or element, within the particular act, sharing the limitations and particularity of the act. But such a limited and particular object could have no identity with itself from act to act, nor could it belong to a world, as common to other individuals. If, however, manipulation be considered not merely as grasping and direct handling, but as the manipulation of a tool in dealing with a third thing, it is no longer restricted to a limited repertoire of manual movements. It is not that the engraver or the woodsman or the baseball pitcher acquires an increased manual dexterity, a great range and fineness of movement, but that the manipulation of a tool-user may enter as a factor into an indefinite number of possible acts; they belong within a system which may be extended, complicated, and organized without limit.

Being an object is not merely an affair between itself and the human individual. One does not perceive an object merely as so far away from oneself, but as above or below, behind or in front of, or beside other objects and at roughly determinate distances from them. So one does not find its physical massiveness merely in its direct resistance to the pressure of the hand, but through the blows of the axe on the tree, the crushing of the glass, the thrown stone, or the rebound of the volleyed tennis ball. An object can appear as an object only within a field containing other objects and immersed in a continuum bringing them together with one another and with the percipient individual.

It must be recognized, however, that it is only as moments of directed activity that objects are perceived or cognized. To see, one's gaze must be focused and one's attention be directed, and it is only through such directed focusing that a field is organized in which objects appear. Such directed activity determines a perspective, not merely visual, but dynamic. As visual perspective selects or determines aspects, in their particularity uniquely characterizing the perspective, so the directed act determines dynamic aspects. One perceives what is relevant to one's end and is blind to the irrelevant. But these perspective aspects do not themselves constitute the visual field, nor do the perspectives of nature constitute a world, as Mead maintains in his ontology. We do not constitute the objects of our perception and thought by what Mead terms "the fitting together of perspectives." Nor do we, while in one perspective, include another within it. If in some sense we are limited to aspects, we see them as aspects of the objects we perceive. Perspectivity is not merely a fact of perception for the percipient. Thus the object is perceived as more than the visible aspect; it is cognized as more than it is apprehended as. Nor is this "more" a limited more, to be exhausted in the aspects of other familiar perspectives or such as have been experienced in the past. There is, indeed, in all cognition, a limitation by negation, but if certain possibles are excluded, there remains an inexhaustible potentiality. In short an object of perception is an individual and not a mere particular exhausted in confinement to a particular act.

So far as perception is cognitive, however, one perceives an individual object as a particular case of some universal. Thus the stick of wood I pick up to put on the fire is an individual object but I perceive and pick it up as a stick, of appropriate size and shape, to be laid in its place in the fireplace. So any tool is such through its shape, its size, and other universal properties, which it may share with innumerable others. It is at once an individual and a particular case of a universal. It is as a particular case that one deals with it on any given occasion; one selects, for example, a pencil from the number of objects lying on one's desk, and one selects it and uses it with a view to the sharpness of its point, the color and hardness of its lead. One is immediately concerned with it only in respect to its relevant aspects, as a factor in the act in which one is engaged. But one is prepared for the interruption of one's writing by the breaking of the lead; the pencil now becomes an object to be sharpened and other aspects spring into view. If in the process of sharpening we suddenly discovered that the lead did not go the whole length of the wooden cylinder, or if it explode in our hands,

we should be surprised, and we should then recognize that what we had taken for a pencil was only a fake or something mysterious. But even though we found it was not the pencil we had mistakenly perceived it as, we should still perceive it to be the same individual object. The original object has not disappeared and another taken its place as we cease one act and begin another. In fact we perceived the pencil all along as an individual which was more than it was perceived as (to adapt a familiar locution of Dewey). We perceived it not only as a pencil to write with but as one in need of frequent sharpening, but if we did not perceive it as the fake incapable of being sharpened or as an infernal machine, we did perceive it all along as an individual and as such charged with potentialities. We are constantly surprised and often meet the unexpected, but we are nevertheless prepared for the surprising and we expect the unexpected. Otherwise we should be incapable of learning anything new or recognizing a mistake as a mistake. It is because the objects of perception are genuine individuals that they can be objects of knowledge about which judgments can be made. And it is also because they are perceived as individuals, inexhaustible in their reactions to the act in progress, that they may be objects for the acts of others, genuinely common objects concerning which we may discourse significantly to others.

Nor is the act which determines the perspective in which objects must appear to be known (since all our knowing is in some perspective) merely a particular act. Mead truly asserts that the acts of thinking human beings are fragments of social acts embracing other acting individuals, even though he fails to make adequate application of this conception. But an act must also be an incident in, or a phase of, the life of an enduring and becoming individual, who lives in and through the living of others. As an incident, each act passes, and as a phase it is complete. Nevertheless as the act of a conscious intelligent being it is experienced as belonging within the broken continuum of living. The range of my action like the range of my vision is limited to an environment determined by my actualized powers and in turn determining me in my possession of them. But the environment in which I act, like the scene which I see, I recognize as belonging within the wider continuum of a world, beyond the range of my action, but merging into it as into the unseen distance beyond my vision's range. Only an act which belongs to the continuous living of an individual and is carried on within a world can yield either a self or an object known.

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COMMENTS AND CRITICISM

Reply to Ernest Nagel's Criticism of My Views on Quantum Mechanics

In a review [1] of my book,[2] Ernest Nagel raised several objections against my analysis of quantum mechanics. I should like to answer these objections since I think that the discussion may clarify the issues.

In his first objection, Nagel argues: "Reichenbach maintains that quantum mechanics is an acausal theory on an exhaustive interpretation, because it is theoretically impossible to predict with any desired degree of precision the simultaneous values of two conjugate parameters such as q and p" (*RN*, p. 441). This passage ascribes to me a view that I have never maintained; Nagel's formulation represents a conception of quantum mechanics now customary among certain physicists, but certainly not my conception. I have explained in my book that the introduction of exhaustive descriptions is connected with the determination of unobserved objects; that the problem of unobserved objects must be separated from the problem of a transition from strict causal laws to probability laws (*PhF*, pp. 1, 14); and that the difficulties in the determination of unobserved objects arise, not from Heisenberg's principle of indeterminacy, but from certain causal anomalies the inevitability of which I have formulated in a principle of causal anomaly (*PhF*, pp. 33, 41, 44). The transition to statistical laws does not necessarily bring with it causal anomalies, in the meaning of my definition of the term; I use the term, rather, to indicate certain deviations from the principle of action by contact (*PhF*, pp. 26, 28, 29) which the whole of macrocosmic physics has shown to be an intrinsic component of the principle of causality. A replacement of causal laws by probability laws does not, by itself, necessitate a violation of the postulate of action by contact; in other words, it is logically possible to construct probability laws satisfying the postulate. For this type of probability laws I have used the name "probability chains" (*PhF*, p. 123); the name refers to cases where the probability of the future state of a localized occurrence is dependent only on its present state. The proof of the principle of anomaly which I have given is so devised that it includes reference to probability chains, i.e., it shows that for the unobserved objects of quantum mechanics no probability chains can be constructed and that there-

[1] This Journal, Vol. XLII (1945), pp. 437–444. I shall quote this review by the abbreviation "*RN*."

[2] *Philosophic Foundations of Quantum Mechanics*, Berkeley, University of California Press, 1944. The book will be quoted by the abbreviation "*PhF*."

fore the postulate of normal causality can not be satisfied even when a transition from causal laws to probability laws is admitted (*PhF*, § 26). In the particle interpretation of the interference experiment (*PhF*, § 7) the principle of anomaly finds its expression in the fact that, even if we regard the future states of a particle passing through a slit as determined only with probabilities, these probabilities will depend on whether the second slit is open. It is such action at a distance, unavoidable for any exhaustive interpretation, which makes it impossible to speak of unobserved objects, in the realm of quantum mechanics, in the same sense as in classical physics; or in the terminology of my book: which makes it impossible to introduce a normal system for the description of interphenomena. That similar causal anomalies result for the wave interpretation is explained in *PhF*, p. 26; I have shown, however, that with the transition to the wave interpretation the anomalies are shifted to other points of the description.

The further discussion of this point may be connected with Nagel's second objection. Nagel takes over a certain view held by some physicists, namely, that causality can be reëstablished when the physical state is regarded as given, not by parameters of the q-and-p type, but by Schrödinger's ψ-function. The argument referred to is based on the fact that the ψ-function is controlled by Schrödinger's differential equation; since a differential equation, so it is argued, expresses action by contact, the ψ-states follow a law of the causal type. This argument overlooks the fact that not all developments to new ψ-states are governed by the Schrödinger equation. As soon as an interaction with other matter occurs, the physicist introduces a new ψ-function by a procedure that is sometimes called a reduction of the wave packet; this transition to a new ψ-function is not governed by Schrödinger's equation and represents a causal anomaly if the ψ-function is regarded as a physical state. Since the latter conception is the same as the wave interpretation, the anomaly can be illustrated by the fact that the whole wave front disappears instantaneously when a narrowly localized flash on a screen occurs. I have explained these relations in *PhF*, p. 31, where I have discussed the attempt to save causality by the use of a wave interpretation. This interpretation, too, can secure normal causality only for limited stretches of occurrences, but not for all occurrences.

The following consideration may serve as an illustration showing that the conception of the ψ-function as a physical state does not reintroduce causality. Assume we put into an insulating box a source of radiation together with certain instruments of measurement so that a closed system results; the instruments may be so

devised that the results of their operations are laid down in writing on slips of paper. Given the initial data of the system, it is possible (in principle) to determine the function $\psi(t_o)$ pertaining at the time t_o to the whole system, including the instruments of measurement; this determination is made by the use of a set of rules ρ, such as known from the presentations of quantum mechanics. Schrödinger's equation, then, allows us to compute the form $\psi(t)$ of the function at a later time t. When we now open the box at the time t and look at the writing on the slips, we shall find a new set of data; these data, however, subject to the methods of computation formulated in the rules ρ, do not determine the function $\psi(t)$, but a different function $\psi'(t)$. This difference results from the fact that the indications of the measuring instruments at the time t are predictable, at the time t_o, only with probabilities; the function $\psi(t)$ will represent a mixture of all possible indications of the instruments, each multiplied by its corresponding probability. What the Schrödinger equation determines is, not the actual future state of the system at a given time, but the ordered totality of all its possible future states at that time. The transition from the function $\psi(t)$ to the function $\psi'(t)$, then, represents a causal anomaly, since it is not governed by the Schrödinger equation.[3]

The set up of our imaginary experiment makes clear, too, that it is not permissible to make the act of observation account for the new function $\psi'(t)$. The observation by the human observer is here a purely macroscopic affair; the reading of the slips does not influence the system. As long as we do not open the box we do not know the function $\psi'(t)$ and shall therefore use the function $\psi(t)$ as its best substitute; but in doing so we know that we do not know the actual physical state $\psi'(t)$. By the actual physical state I understand the ψ-function determined by the rules ρ in terms of the macrocosmic occurrences existing at the same time.

Our illustration shows that the relation of determination holding between macrocosmic occurrences and the ψ-function is an objective relation and has nothing to do with the existence of a human observer. To conceive the ψ-function as a physical state is meaningful only when the ψ-function is regarded as determined by simultaneous macrocosmic occurrences, in the sense of this objective relation. It follows that ψ-states are not throughout connected by causal chains, and that this breakdown of causality can not be

[3] More precisely speaking: assume that no macrocosmic occurrences happen between t_o and t, and that the first indication of a measuring instrument happens at t; then the function $\psi(t-\epsilon)$, where ϵ is a small time interval, represents a physical state for every $\epsilon > 0$. It is the transition from $\psi(t-\epsilon)$ to $\psi'(t)$ which constitutes the causal anomaly.

ascribed to the interference by an observer, or regarded as a consequence of the epistemological distinction between subject and object.

It is sometimes argued that the transition from the function $\psi(t)$ to the function $\psi'(t)$ must not be judged from the viewpoint of causality, that $\psi'(t)$ is a function based on information different from that leading to $\psi(t)$, and that therefore one can not speak of a causal anomaly. This objection misses its point because it confuses two interpretations. The argument is correct if the ψ-function is regarded as an instrument of formulating probabilities; the discontinuous transition from $\psi(t)$ to $\psi'(t)$, then, presents no more difficulties than, say, the discontinuous transition from the probability of death computed for a twenty-year-old man to the death probability computed for the same man on the additional information that he has tuberculosis. If, however, the ψ-function is regarded as a physical state this way out is closed; both $\psi(t)$ and $\psi'(t)$, then, are physical states and as such subject to a consideration from the viewpoint of causality. In this interpretation, therefore, the discontinuous transition represents a causal anomaly. The confusion of interpretations is one of the weak spots of the customary discussion of quantum mechanical issues; it has blinded the eyes of some physicists to the extent that they do not see the causal anomalies unavoidable for every interpretation. The probability interpretation of the ψ-function, of course, has its anomalies, too; they manifest themselves, not in the time development of the ψ-function, but in the behavior of particles, since this interpretation, in its exhaustive form, is identical with the particle interpretation.

I should like to add a remark concerning the importance of the principle of anomaly. It has sometimes been argued that Heisenberg's principle does not rule out causality for the objective occurrences, that, since it excludes the knowledge of simultaneous values of conjugate parameters, it limits only our *knowledge* of future occurrences, leaving it open whether there is a determinacy in the objects behind the indeterminacy of predictions. So far as I know, Heisenberg himself has made such statements; and Nagel seems to advocate such an interpretation in *RN*, p. 442, when he says that "the Heisenberg indeterminacy relation does not warrant any conclusion as to the failure of causal laws in quantum mechanics." In *RN*, p. 439, Nagel quotes a passage from my book in which I say that such a conception of causality would be meaningless. In the following paragraph, not quoted by Nagel, I mention, however, a second conception according to which causality could be reintroduced in the form of a definition, or convention, though not in the form of a verifiable statement (*PhF*, pp. 4–5). In this conception,

causality is introduced as a relation *post hoc* which connects an observed value with an antecedent unobserved value, the latter being so defined that the observed value appears as strictly determined by the inserted value. Although such a type of causality could not be used for predictions, it might be regarded as an objective relation knowable, however, only after its occurrence.

What the principle of anomaly proves is that even this last attempt at saving causality breaks down. We can not insert, by definition, unobserved values in such a way that the observed values are connected by causal chains; any such definition leads to contradictions. This result rules out causality by a much stronger argument than that based on verifiability. It shows: even those who refuse to subscribe to the verifiability theory of meaning can not claim that there is a possibility of causal connection behind the verifiable relations of occurrences; for if there were, there must exist at least one way of inserting causal chains, by definition, between the observables.

I therefore regard the establishment of the principle of anomaly, which Nagel's review does not mention as such, as the ultimately decisive argument against all claims for causality in the physical world. It is not the Heisenberg principle of indeterminacy but the principle of anomaly, derived independently from the basic laws of quantum mechanics, which makes impossible any exhaustive description of unobservables in the sense assumed for classical physics. The development of the problem of unobserved objects, therefore, reiterates a development known to us from other epistemological discoveries within modern physics. The classical system is shown to be based upon certain tacit assumptions which had never been explicitly formulated before the needs of physics led at the same time to their formulation and their abandonment.

In his third argument, *RN*, p. 443, Nagel questions my distinction between phenomena and interphenomena. This objection is easily answered. I define phenomena as occurrences inferred from observations by means of classical theory alone, whereas the inferences leading to interphenomena require the application of quantum mechanical theory (*PhF*, p. 21). I do not see why this distinction is called "vague" by Nagel. It is certainly the very distinction on which any analysis of the unobserved objects of quantum mechanics is to be based. Considering the phenomena as observables means that the problem of unobserved objects can be disregarded for classical physics; only for what I call interphenomena can we not disregard this problem because it is here that the laws of quantum mechanics intervene.

I turn now to Nagel's objections against the use of a three-

valued logic, set forth in *RN*, pp. 443–444. His first argument is that the word "true" of three-valued logic can not have the same meaning as the corresponding word of two-valued logic, because the latter term has only one alternative, whereas the first has two. It is certainly correct that if the truth-rules are regarded as included in the definition of the word "true," the two words do not have the same meaning. We shall then say, rather, that the three-valued truth is the *analogue* of the two-valued truth. What entitles us, however, to use the same word for both, is the fact that in both cases truth has the meaning of *assertability* (*PhF*, p. 153).

In a further objection, Nagel claims that my readers are "left in the dark" about the usage of such terms as "true" and "indeterminate" in three-valued logic. Is it that Nagel has overlooked my truth tables 2, *PhF*, p. 146? In these tables I define the terms of three-valued logic in those of two-valued logic, and I do not see what else could be required. Furthermore, Nagel questions whether the admission of indeterminate statements does not violate the verifiability theory of meaning. The answer is simple: in a three-valued logic a statement is meaningful if it is verifiable as true, or false, or indeterminate. Since my tables 2, *PhF*, p. 146, give strict rules stipulating under what conditions a statement is indeterminate, this definition is legitimate.

After the explanation of these minor items I should now like to answer the question why I regard a quantum mechanics in the form of a three-valued logic as superior to the Bohr-Heisenberg interpretation. I think my presentation has made it sufficiently clear that I do not regard the choice between the various interpretations as governed by arguments of truth or falsehood, but as a matter of technical advantages of language systems. Let me therefore summarize the advantages of the three-valued system.

In every language so far considered by logicians the rule is followed that if a statement "*P*" is meaningful, and if a statement "*Q*" is meaningful, the statement "*P* and *Q*" is also meaningful. This rule, in fact, is so convenient, that it would appear unreasonable to abandon it. Now the difficulties into which this rule leads for quantum mechanics can be explained as follows.

When we define meaning by the possibility of verification, the statement "*P*" about a future value of the momentum p must be regarded as meaningful since it is possible to make a corresponding measurement. As it is also possible to measure, instead, the value q of position, the statement "*Q*" about the future position must also be regarded as meaningful. But quantum mechanics has shown that it is not possible to measure *both p and q;* the statement "*P* and *Q*" would therefore turn out to be meaningless.

If, in this situation, the above rule is to be maintained, such can be done only by a change in the definition of meaning. There are two possible changes leading to the desired result.

The first change—and that is the one introduced by the Bohr-Heisenberg definition of meaning—consists in basing the definition of meaning, not on the *possibility* of verification, but on the *actuality* of verification. Only when a measurement is actually made is the statement about the value p, or q, regarded as meaningful. The above rule is thus saved; "P and Q" is not meaningful, but since at a given time t only one of the two sentences "P" and "Q" can be meaningful, the rule is satisfied. It then follows, however, that we can not regard a statement about a future value p, or q, as meaningful before we know that a measurement has been made; that is, a physics dealing with the future would include reference to statements of which we do not yet know whether they will be meaningful. A physicist asking a question about the future, therefore, would have to retire into the metalanguage; instead of asking, "will the entity q have the value q_1?" he will have to ask: "if the linguistic expression 'the entity q has the value q_1' is meaningful at the time t, will the expression be true or false?"

Such language is rather inconvenient. Its inadequacy may be illustrated by an application of its principles to macrocosmic physics. For instance, when actuality of verification is required for meaning, the statement that it snows now on the North Pole is meaningless since there is at present no observer at the North Pole. The whole domain of unknown truth would thus be eliminated from physical language and could be discussed only in the metalanguage. If, however, we do not wish to use such a narrow rule of meaning for classical physics, I do not see the reason why we should prescribe it for quantum physics.[4]

The other way out of the difficulty consists, not in narrowing down the definition of meaning, but in widening it. This is the way followed in my interpretation by a three-valued logic. In this interpretation, the statements "P" and "Q" are both meaningful, but the statement "P and Q" is meaningful, too, although it can never be verified as true. The widening of the definition of meaning, then, consists in the rule mentioned above that statements are meaningful if they can be verified as true, false, or indeterminate. The principle that meaning is defined in terms of the possibility of

[4] Incidentally, Heisenberg and Bohr were not correct in regarding their restriction of meaning to be a consequence of the verifiability theory of meaning. The quantum mechanical restriction of meaning can be grounded only on the fact that it eliminates the assertion of causal anomalies. The same result, of course, is reached by my interpretation through a three-valued logic.

verification is thus satisfied. On the other hand, the complementarity of the statements "*P*" and "*Q*" is expressed in the fact that the statement "*P* and *Q*" can never be true but will be either indeterminate or false.

The complementarity is thus expressed, not by a statement in the metalanguage, but by a statement in the object language. We notice here the decisive advantage of the interpretation by a wider meaning over the interpretation by a narrower meaning: it enables us to formulate the laws of physics in the object language. For a further explanation of how this aim is achieved for the law of complementarity as well as for other laws, I refer to §§ 32–33 of my book.

I should like to emphasize once more that we are not concerned here with questions of truth or falsehood of language systems, but with questions of the superiority of a linguistic technique. There seems to be no doubt that, from a logical viewpoint, the three-valued interpretation is superior. Moreover, it appears to me that the three-valued interpretation corresponds better than the other one to the language behavior of the physicist, in which we do not find an explicit use of the metalanguage. In fact, the three-valued language may appear as the formalization of the comparatively loose language habits that have crept into modern physics with the development of quantum mechanical notions.

These results will simplify the answer I have to make to Nagel's concluding remark. He asks "whether the entire system of three-valued logic may not be translatable into the customary two-valued one." The answer, of course, is affirmative. Ever since the first publication of a multi-valued logic it has been known that such a translation may be given; thus, E. L. Post [5] has shown that the n truth values can be interpreted in terms of a frequency of two-valued propositions. Similarly my truth tables 2, *PhF*, p. 146, can be used for the same purpose; by means of them every three-valued statement can be coördinated to a pair of two-valued statements. A general proof of this theorem, as yet unpublished, was developed by W. Gustin after discussions in my seminar at the University of California at Los Angeles.

The translatability shows that the question of a logic suitable for a system of physics may be compared to the question of a suitable geometry. As well as geometry, logic presents us with a class of equivalent languages the choice among which is determined by considerations not based upon truth or falsehood. It is only the results following from an application of a language system to real-

[5] *American Journal of Mathematics*, Vol. XLIII (1921), p. 163.

ity that express properties of the physical world. I have shown at another place[6] that in a physical world of a certain kind the use of a Euclidean geometry leads to causal anomalies; the determination of that geometry which describes the world free from anomalies, therefore, reveals structures of the physical world. Similarly, it must be regarded as a property of the world of the quanta that a language free from causal anomalies, if it is not to employ the metalanguage for the statement of physical laws, must be constructed in terms of a three-valued logic. It is for this reason that I regard a three-valued logic as the adequate linguistic form of quantum mechanics.

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PROFESSOR REICHENBACH ON QUANTUM MECHANICS: A REJOINDER

Professor Reichenbach's "Reply" to my review of his book serves to make clearer some of his views on the foundations of quantum mechanics, and readers of this JOURNAL will be grateful to him for the fuller discussions he has now given of a number of important points in his analysis. Nevertheless, if I understand his comments, he does not successfully dispose of any of the issues I raised in my review; and a few brief observations may help the interested reader to decide the matter for himself.

(1) Mr. Reichenbach's assertion that I have attributed to him a view concerning the acausal character of quantum mechanics which he has never maintained, does not seem to me to be quite borne out by the facts. On page 2 of his book, where he first explains what he understands by causal laws, he declares that "the statement that nature is governed by strict causal laws means that we can predict the future with a determinate probability and that we can push this probability as close to certainty as we want by using a sufficiently elaborate analysis of the phenomena under consideration." He also indicates that classical physics is causal in this sense, that the causal laws of physics predict "physical states" characterized in "observational terms," and that the classical definition of physical states in terms of p (momentum) and q (position) is one of the things he has in mind in discussing causal laws; and he further declares that in quantum mechanics "Heisenberg's principle of indeterminacy, therefore, leads to a revision of the

[6] *Philosophie der Raum-Zeit-Lehre*, Berlin, de Gruyter, 1928, pp. 81–83, 96–99.

statement of causality; if this statement [that the relations of quantum mechanics admit of causal supplementation by interpolation] is to be physically meaningful, it must be made as an assertion about a possible causal supplementation of the observational world" (p. 5). I did not, to be sure, mention Mr. Reichenbach's conception of "causal anomaly," though he regards it as an important feature of his analysis of quantum mechanics; and in this omission I may have been guilty of bad judgment. But in the particular matter I did discuss, I was not guilty of misrepresenting his views.

In any event, however, the central question I raised in the first critical remark of my review—whether the parameters p and q in quantum mechanics are not used in a different sense from the sense associated with them in classical mechanics, and whether the indeterminacy relations between these parameters in quantum mechanics is sufficient to establish the latter as an acausal theory—is not faced by Mr. Reichenbach.

(2) Nor do his remarks on my second criticism appear to me decisive, though I must confess that I do not fully understand them. On the one hand, he seems to agree that given the instantaneous state of a system as specified by the Psi-function, the wave equation of quantum mechanics uniquely determines the state at any other instant. This was just my claim, with the obvious but unexpressed proviso that the boundary conditions for the system under consideration remain constant; and I therefore argued that with respect to the quantum-mechanical description of physical state, quantum mechanics is causal in character. On the other hand, however, Mr. Reichenbach also appears to maintain that the alleged causal character of the wave equation (relative to the appropriate description of state) is negated by the fact that if the boundary conditions of the system are altered, future states of the system are no longer uniquely specified by the wave equation. If this is indeed the point of Mr. Reichenbach's reply (and I am not sure that it is), he is certainly advancing an odd view; for on the very grounds he advances for the acausal character of quantum mechanics, the laws of classical physics must also be regarded as acausal.

(3) Mr. Reichenbach's comments on my third criticism do not clarify the explanation he gave in his book as to what is the difference between a phenomenon and an interphenomenon. To say, as he does, that phenomena are "occurrences inferred from observations by means of classical theory alone, whereas the inferences leading to interphenomena require the application of quantum theory," does not answer the question how classical theory can be employed to recognize such things as collisions between electrons (which are phenomena on Mr. Reichenbach's view), and at the same time to

ignore other properties of electrons (e.g., those they possess between collisions) which that theory also postulates electrons to have. For what an electron is, including what a collision of electrons is, is specified by the *entire* theory, whether it be the classical or the quantum theory; and it is not evident just how statements (such as those asserting electronic collisions) are to be isolated from the theory which gives them significance, and then incorporated into another theory in terms of which those statements must have a different significance.

(4) Mr. Reichenbach meets my question as to what he understands by "true" in his three-valued logic, by declaring that it is "the *analogue* of the two-valued truth," and that "truth" in both the two- and three-valued systems "has the meaning of assertability." This would be a satisfactory reply *if* "assertability" had the same meaning in both systems. However, on Mr. Reichenbach's own showing this can not be the case, since a statement is assertable in the two-valued system only if it is true in the familiar two-valued sense, while in the three-valued system a statement is assertable only if it is true in the three-valued sense. But what this latter sense is, is precisely the point at issue; and accordingly the attempted explanation in terms of "assertability" is a blind alley.

However, Mr. Reichenbach refers his readers to his tables 2, which are said to explain the usage of expressions in the three-valued system in terms of "true" and "false" of the two-valued one. Now those tables certainly do explain under what conditions members of a *special* class of *singular* statements in quantum mechanics are to be judged as true, false, or indeterminate (in the three-valued sense). But these tables just as certainly do not explain how these predicates are to be employed *in general*—in connection with other singular statements or with universal ones. Further rules of usage are obviously required; but until such rules are specified, the meanings of these predicates are not adequately explained.

Mr. Reichenbach also argues that in admitting statements to be meaningful though indeterminate (in the three-valued sense), he is not abandoning the verifiability theory of meaning; he is simply "widening" the definition of meaning: "statements are meaningful if they can be verified as true, false, or indeterminate." This seems to me to involve a curious procedure. How curious it is becomes clear if one considers the argument, constructed by strictly parallel reasoning, that if a sentence can be verified as meaningless, the statement is verifiable (and therefore not meaningless!). The obvious fault in such reasoning is that what is being verified is that a given *sentence* has the *property* of being indeterminate or meaning-

less; the sentence itself, *what* it expresses, is not being verified at all. If I have not blundered seriously, Mr. Reichenbach has widened the verifiability theory of meaning by agreeing that statements which are not verifiable (and therefore not meaningful, in the initial sense of these words) are to be regarded as verifiable (and meaningful, in the newer, wider sense of the words)—if only it is possible to *establish* those statements *as not verifiable* in the old sense of verifiability. But is this not an abandonment of the verifiability theory of meaning?

Mr. Reichenbach finally cites Post's well-known paper to support his claim that the entire system of three-valued logic is translatable into the two-valued system. However, all that Post's paper does establish is that the three-valued logic can be *represented* in the two-valued one: a structural correspondence can be shown to hold between statements in the former and *sets* of statements in the latter. But the fact that the two systems exhibit a certain type of isomorphism is not a sufficient condition for the *translatability* of one into the other.

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BOOK NOTE

ΜΑΡΚΟΥ ΑΝΤΩΝΙΝΟΥ ΑΥΤΟΚΡΑΤΟΡΟΣ ΤΑ ΕΙΣ ΕΑΥΤΟΝ. The *Meditations of the Emperor Marcus Antoninus.* Edited with Translation and Commentary by A. S. L. FARQUHARSON (1871–1942). Vol. I, Text and Translation. Vol. II, Greek Commentary. Oxford: At the Clarendon Press. 1944. N. Y.: Oxford University Press. lxxxiii + 431 pp., 432–935 pp. $12.50.

This monumental and beautiful work appeared after the death of its author, who had devoted many years to its preparation. The first volume contains a learned study of the history of the text of Marcus Aurelius, the Greek text of the *Meditations,* with an English translation in front of it, a biography of Marcus Aurelius, and an English commentary on the *Meditations.* The second volume contains a detailed commentary on the Greek text, and the indices. This promises to be the standard edition and commentary of Marcus for a long time to come. The editor not only gives an accurate text and interpretation based on an exhaustive knowledge of sources and scholarly studies, and guides the reader firmly through every sentence of an extremely difficult work. He also draws on the wealth of his readings in ancient and modern literatures to illustrate the thought of his favorite author, and thus makes Marcus Aurelius

appear as a vital link in the long Western tradition of moral wisdom. If linguistic, literary, and historical aspects are more strongly emphasized than philosophical problems in the narrower sense, this is largely justified by the character of the *Meditations* in which comparatively few and simplified philosophical concepts serve the primary task of moral admonition and edification. This bequest of a great scholar should be received with gratitude and a sense of piety.

P. O. K.

NOTES AND NEWS

The annual meeting of the Western Division of the American Philosophical Association will be held at the University of Chicago, May 9–11, 1946.

The program is as follows:

THURSDAY, MAY 9

2:00 P.M. Epistemology.

Verification and Probability.....*Edwin R. Walker*
Discussion by *Herbert Feigl.*

Causation and Truth.....*Ray Lepley*
Discussion by *Paul Henle.*

Probability as a Guide in Life.....*Rudolf Carnap*
Discussion by *George Gentry.*

2:00 P.M. Philosophy of Religion.

The Use of the Words "God" and "Religion" in Philosophy
L. P. Chambers
Discussion by *H. N. Wieman.*

An Approach to the Concept of Spirit.....*Walter Cerf*
Discussion by *Wayne A. R. Leys.*

The Common Good and the Value Receptacle
Charles Hartshorne
Discussion by *D. Luther Evans.*

4:30 P.M. Past presidential address by *D. S. Robinson.* "A Philosophy for the Atomic Age."

7:30 P.M. Smoker. An informal talk by *T. V. Smith.* "Philosophy and Military Government."

FRIDAY, MAY 10

9:00 A.M. Panel Discussion on "Philosophy in American Education." *Max Black, William Frankena, Harry Jellema, A. E. Murphy, Max C. Otto.*

2:00 P.M. Values.

On the Justification of Ideals.....*Willis Moore*
Discussion by *Archie J. Bahm.*

Whitehead's Theory of Intuition.....*A. H. Johnson*
Discussion by *Victor Lowe.*

Definition in Value Theory.....*Philip Blair Rice*
Discussion by *Wilfrid S. Sellars.*

2:00 P.M. Metaphysics.

A Genetic Theory of Time.....*Erwin Biser*
Discussion by *Bertram Morris.*

Essence and Existence.....*William O'Meara*
Discussion by *Herbert Spiegelberg.*

Second Thoughts on Dualism and Interaction.
Discussion by *Henry V. Cobb.*

4:00 P.M. Public Lecture. "The Philosopher of History and the Modern Statesman." *Kurt Riezler.*

7:00 P.M. Annual Dinner. Presidential Address. "Method and Content in Philosophy." *G. P. Conger.*

SATURDAY, MAY 11

9:00 A.M. Symposium on "Philosophy and World Order." *J. W. Hudson, Frank H. Knight, Harold Taylor.*

11:15 A.M. Annual Business Meeting.

The Fullerton Club will celebrate the Leibniz Tercentenary at a special meeting on Saturday, May 11th, at Bryn Mawr College. Those interested in attending may communicate with Mrs. Grace A. de Laguna, Bryn Mawr, Pennsylvania.

There will be a morning and an afternoon session with the following program: "Leibniz's Message to Us" by Wilmon H. Sheldon; "Leibniz's Theory of Judgment" by Leroy Loemker; "Leibniz and the Art of Inventing Algorisms" by Paul Schrecker; "Leibniz's Theory of Space" by F. S. C. Northrop.